(No Model.) 6 Sheets—Sheet 1.

J. C. & S. DANZIGER.

SHEET FEEDING MACHINE FOR PRINTING PRESSES.

No. 398,710. Patented Feb. 26, 1889.

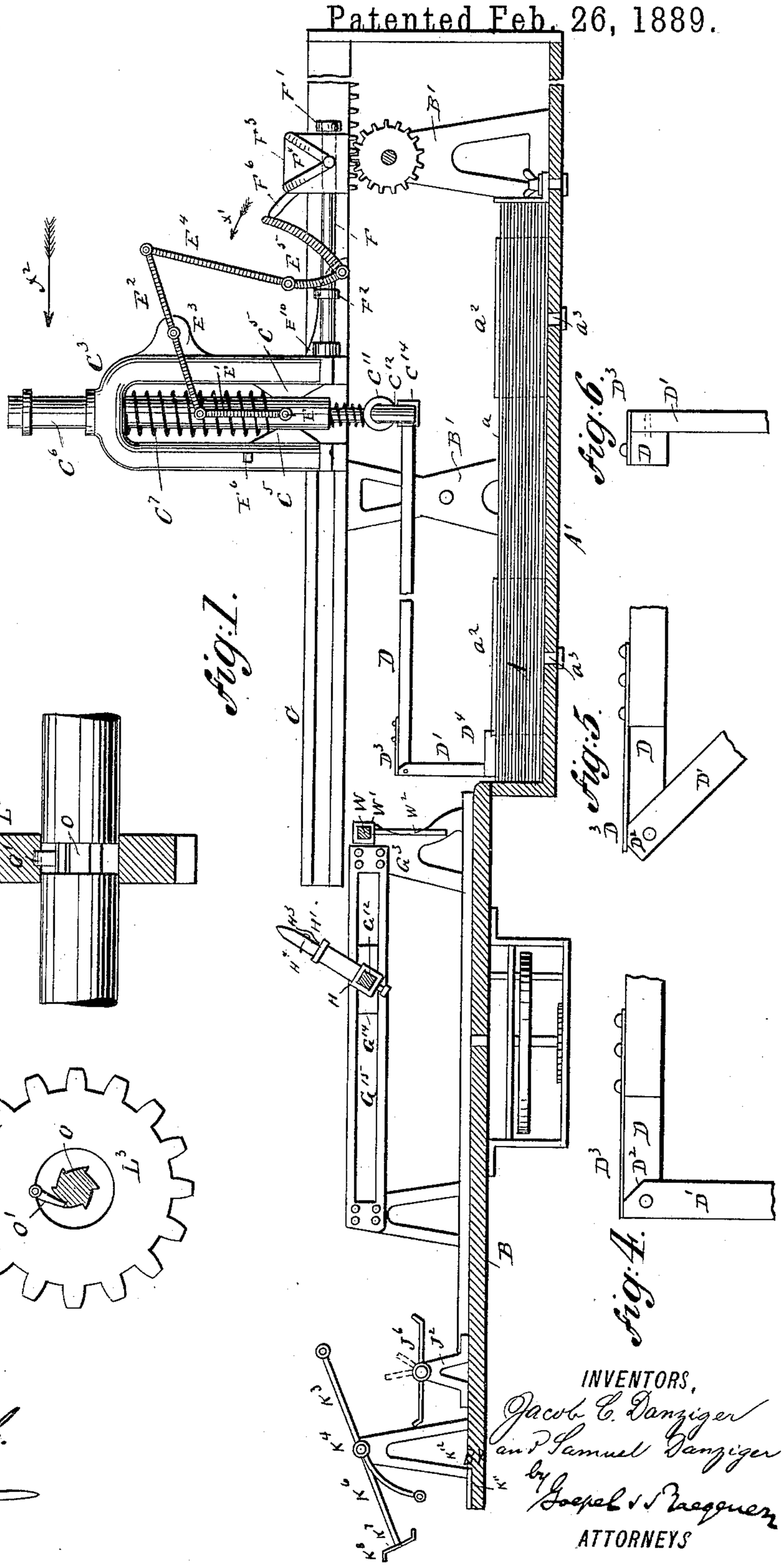

Fig. 1.

Fig. 3.

Fig. 2.

Fig. 6.

Fig. 5.

Fig. 4.

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(No Model.) 6 Sheets—Sheet 2.

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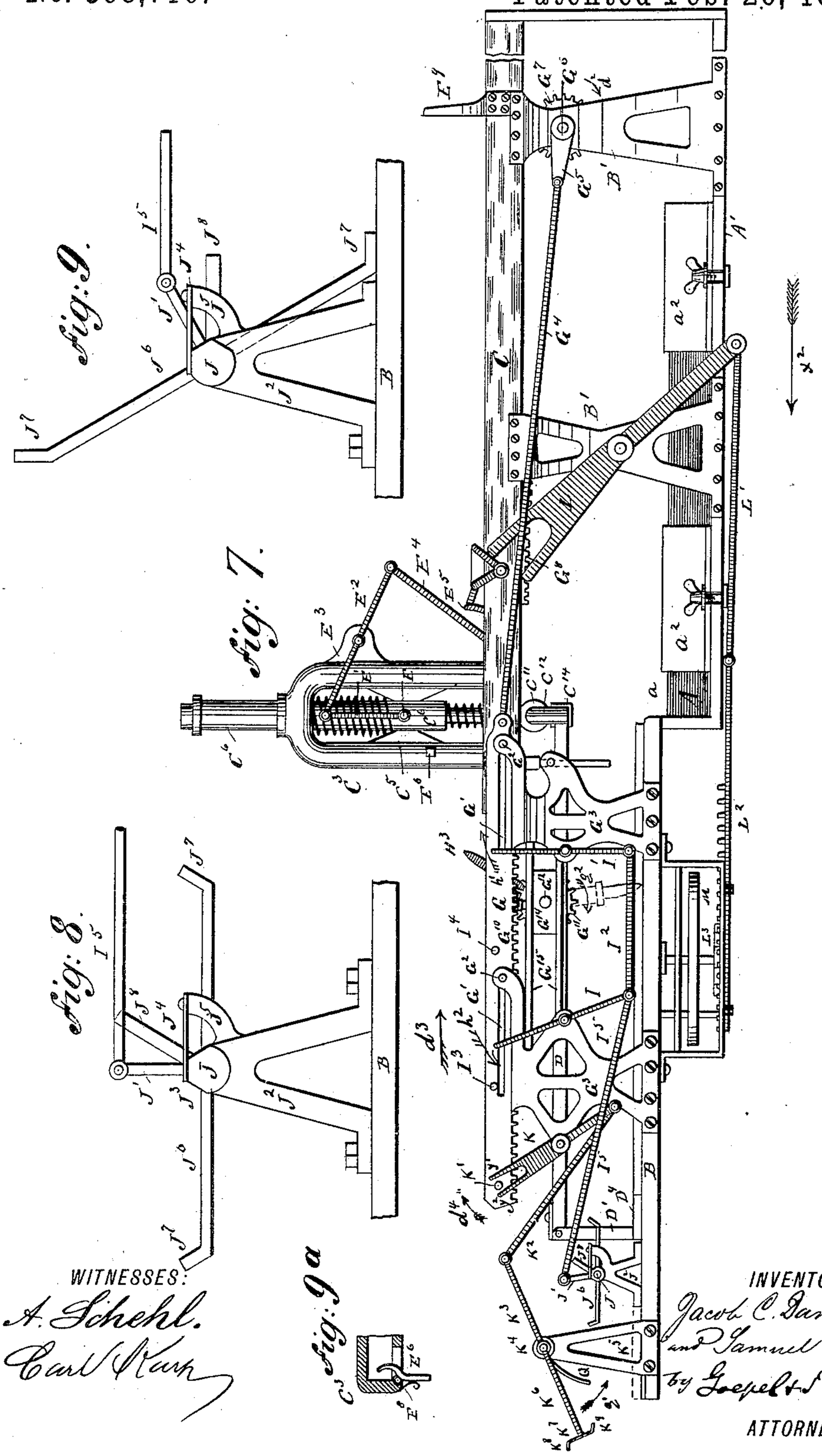
SHEET FEEDING MACHINE FOR PRINTING PRESSES.

No. 398,710. Patented Feb. 26, 1889.

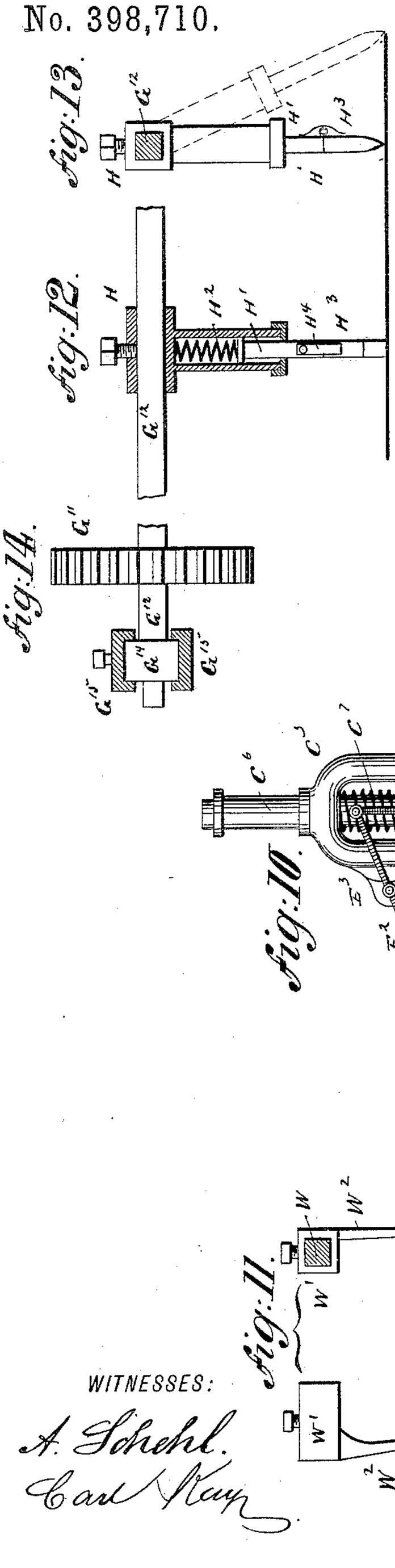


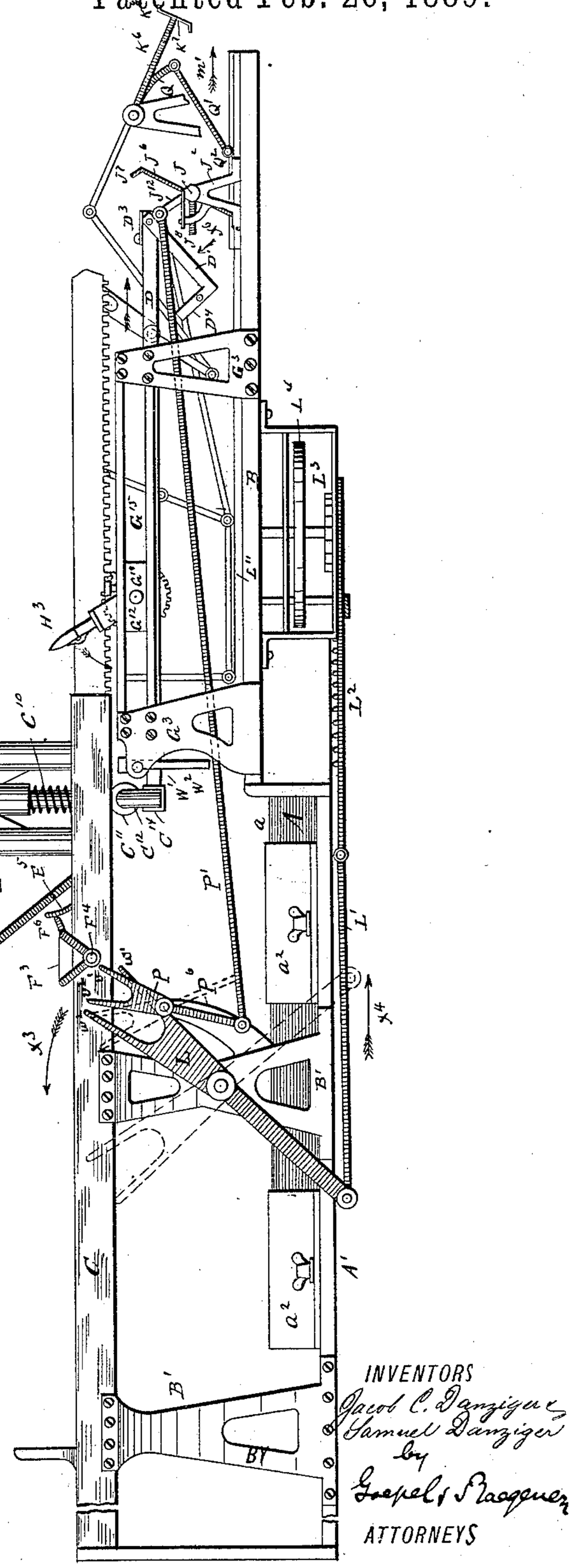
(No Model.) 6 Sheets—Sheet 3.

J. C. & S. DANZIGER.

SHEET FEEDING MACHINE FOR PRINTING PRESSES.

No. 398,710. Patented Feb. 26, 1889.





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(No Model.) 6 Sheets—Sheet 4.

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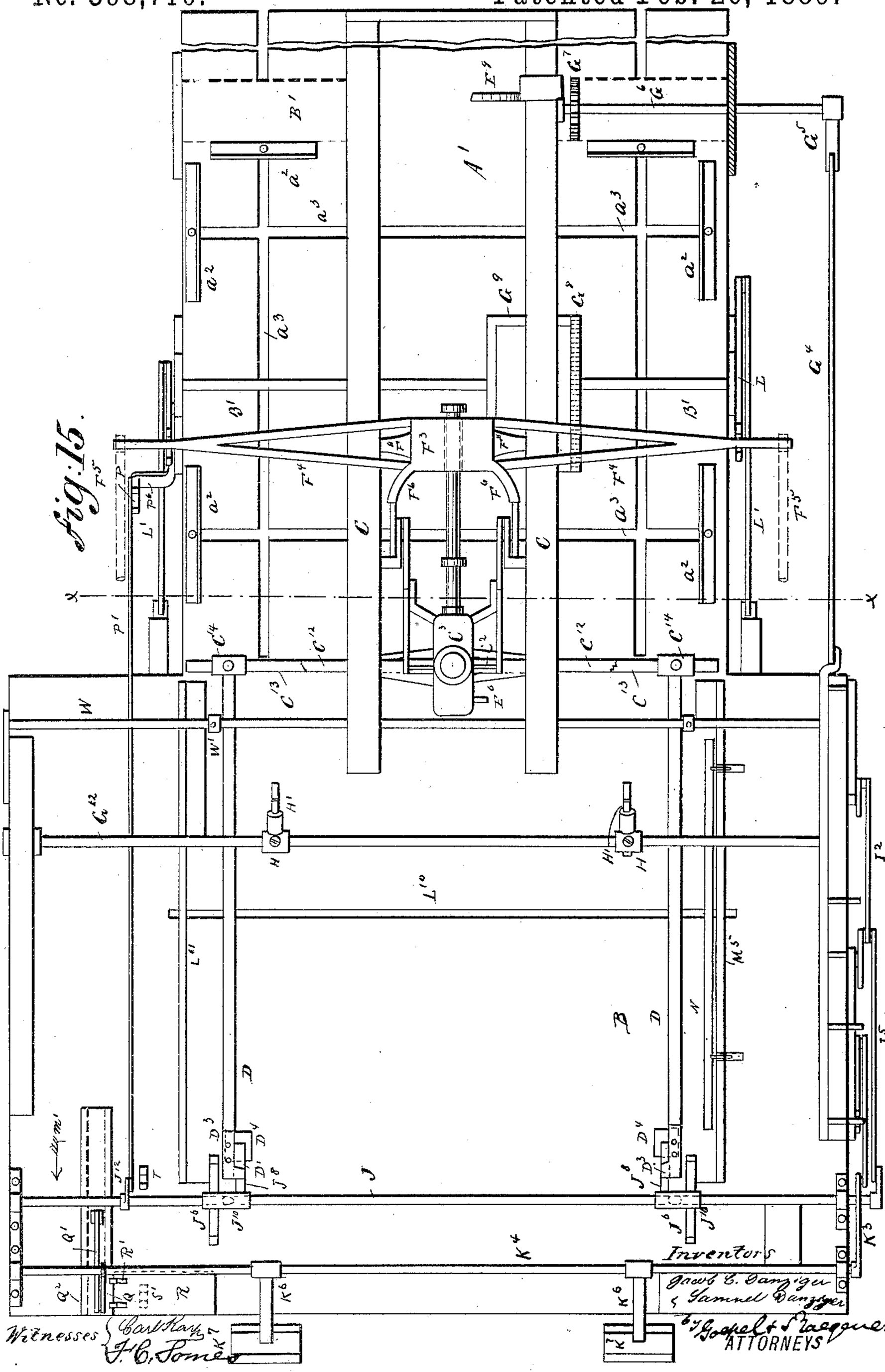
SHEET FEEDING MACHINE FOR PRINTING PRESSES.

No. 398,710. Patented Feb. 26, 1889.

Fig. 15.



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SHEET FEEDING MACHINE FOR PRINTING PRESSES.

No. 398,710. Patented Feb. 26, 1889.

Fig. 17.

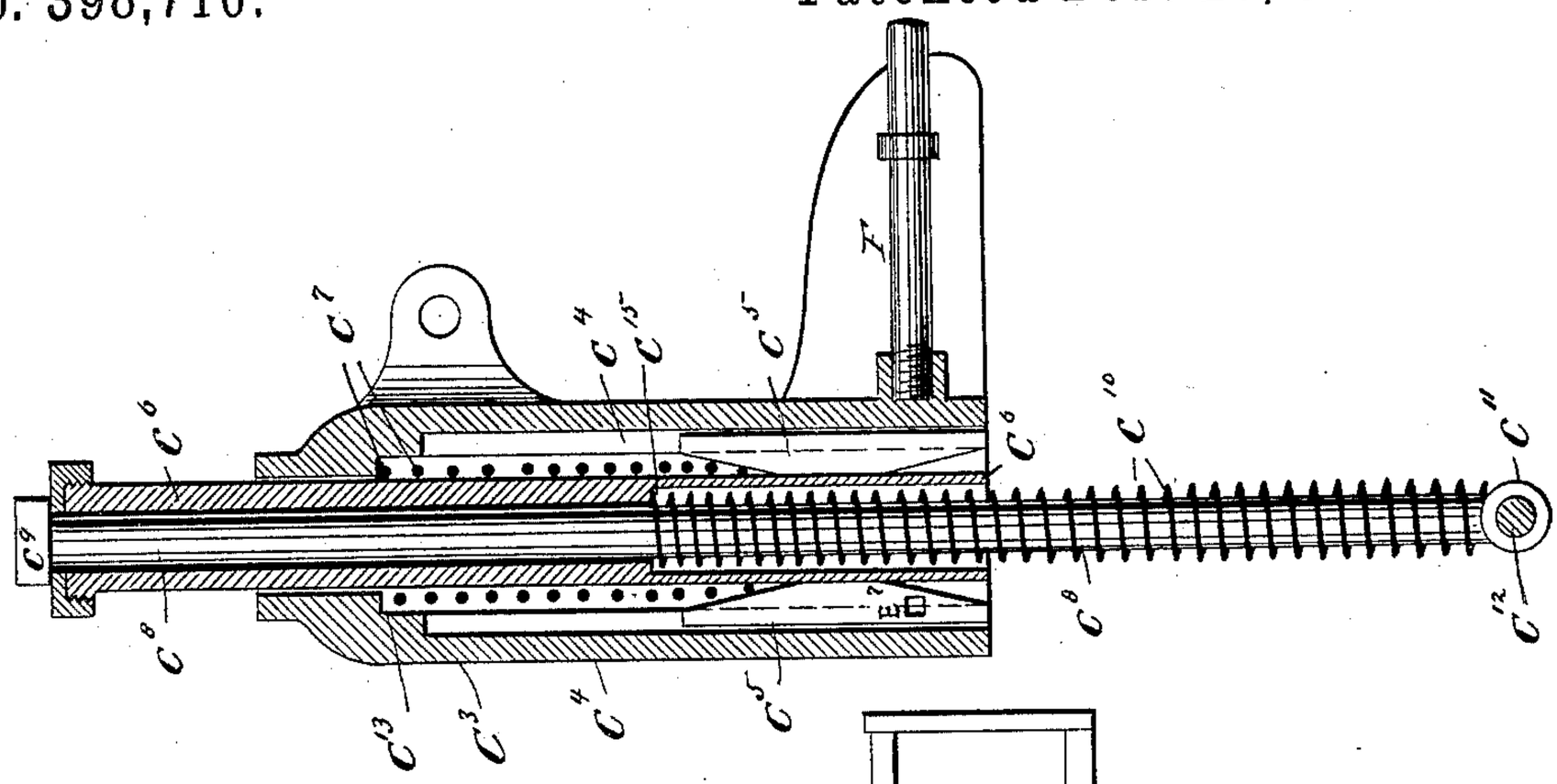
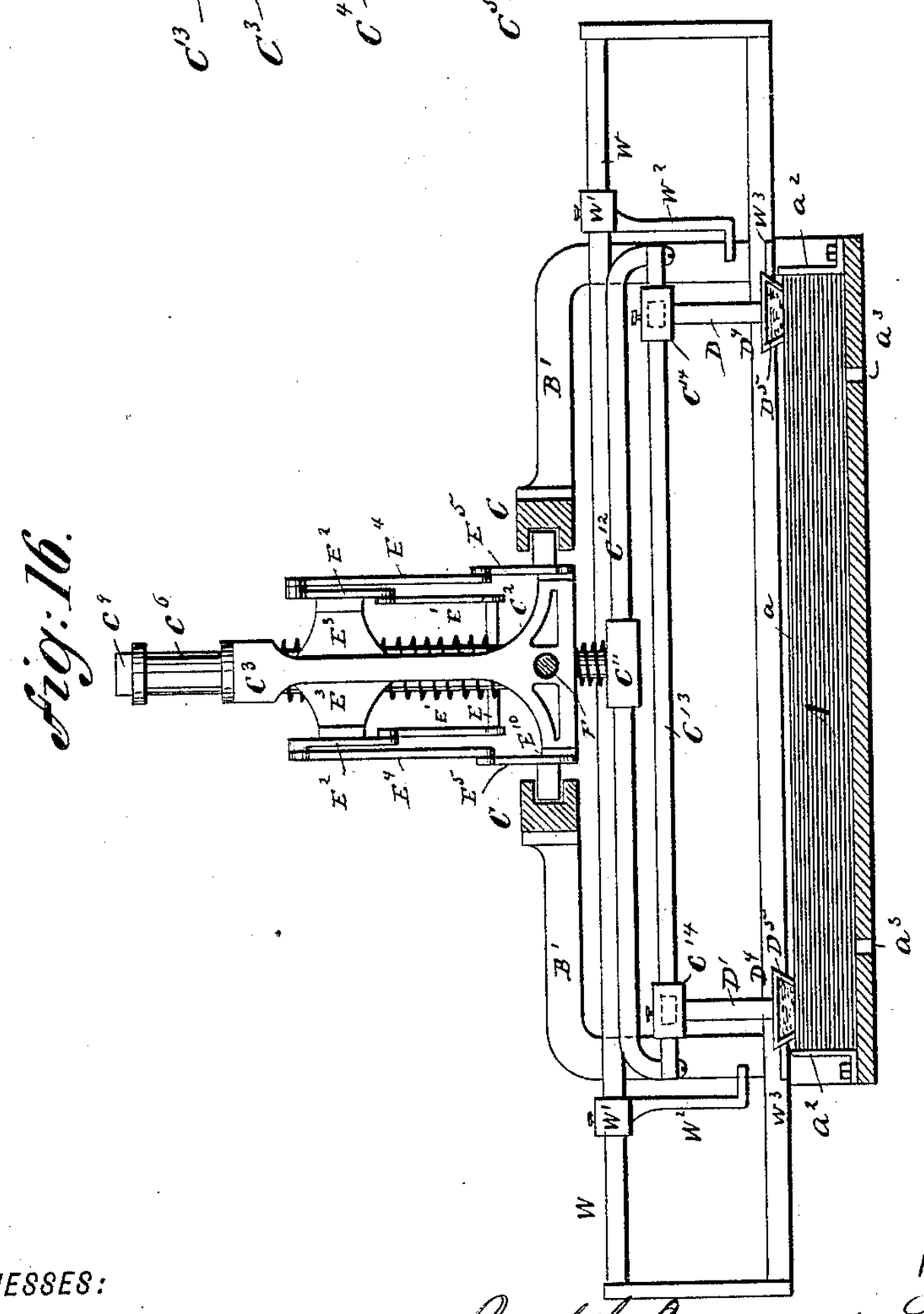


Fig. 16.



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(No Model.) 6 Sheets—Sheet 6.

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SHEET FEEDING MACHINE FOR PRINTING PRESSES.

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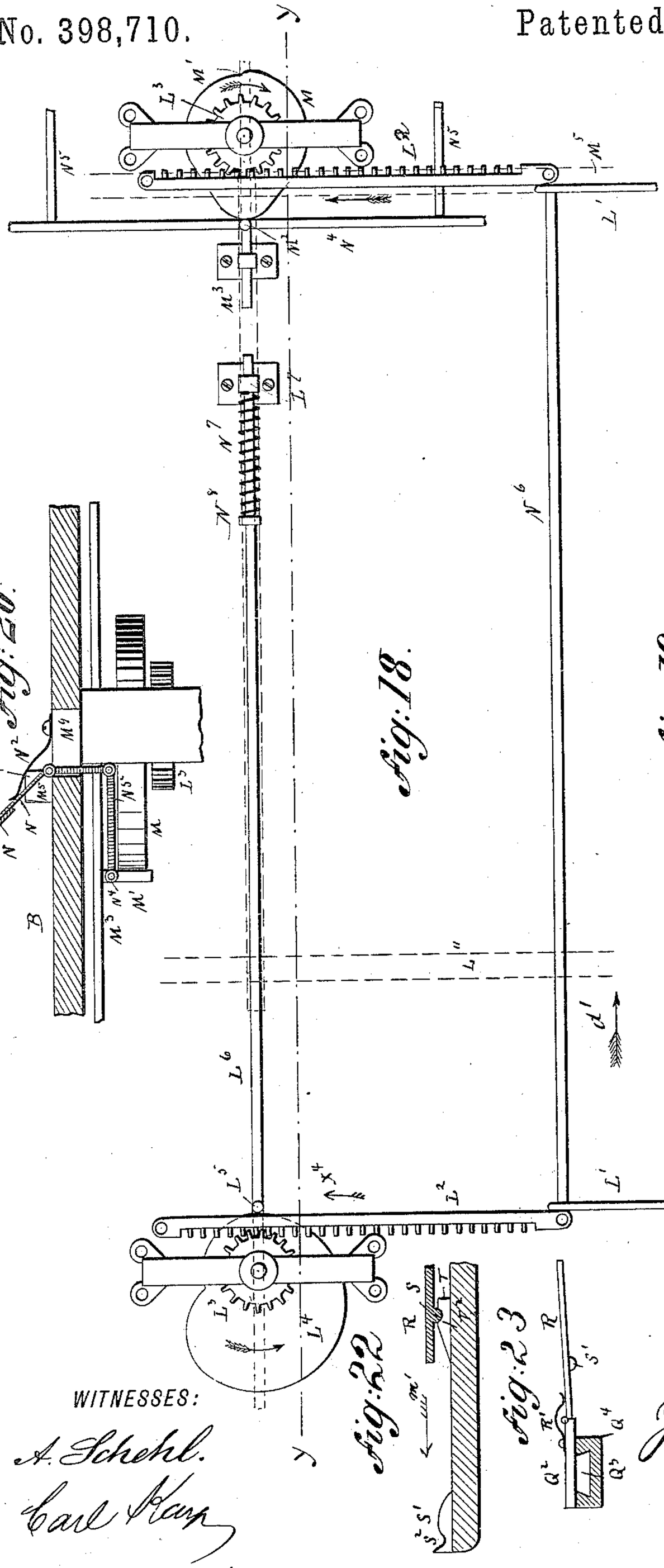

Fig. 18.

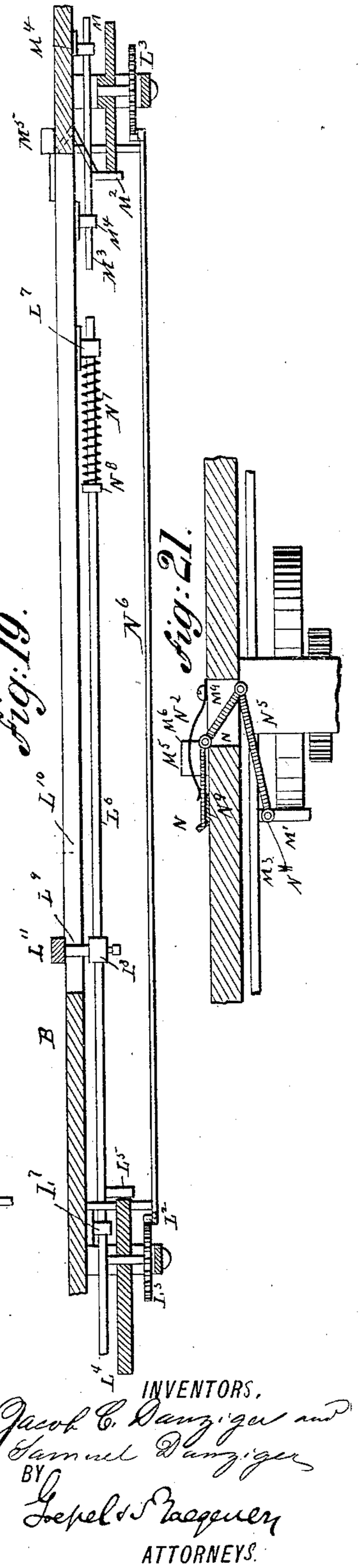

Fig. 19.

Fig. 20.

Fig. 21.

Fig. 22.

Fig. 23.

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UNITED STATES PATENT OFFICE.

JACOB C. DANZIGER AND SAMUEL DANZIGER, OF CINCINNATI, OHIO.

SHEET-FEEDING MACHINE FOR PRINTING-PRESSES.

SPECIFICATION forming part of Letters Patent No. 398,710, dated February 26, 1889.

Application filed February 20, 1888. Serial No. 264,552. (No model.)

To all whom it may concern:

Be it known that we, JACOB C. DANZIGER and SAMUEL DANZIGER, both of Cincinnati, in the county of Hamilton, State of Ohio, have invented certain new and useful Improvements in Sheet-Feeding Machines for Printing-Presses, of which the following is a specification.

This invention relates to a new and improved device for feeding paper to printing-presses, especially color-printing presses, such as are used for printing labels, &c.

The object of our invention is to provide a feeding device that can be attached to and operated from the printing-machine, and which feeds the sheets accurately and truly to the printing-machine in the most perfect manner.

The invention also consists in the construction and combination of parts and details, as will be fully described and set forth hereinafter, and finally pointed out in the claims.

In the accompanying drawings, Figure 1 is a longitudinal vertical sectional view of our improved paper-feeding machine for printing-presses, showing the parts in the position they have at the moment when a sheet is being picked up, parts being broken out and others omitted. Fig. 2 is a side view of a cog-wheel mounted loosely on its shaft and engaged therewith by a ratchet and pawl, the shaft being in section. Fig. 3 is a vertical transverse section of the wheel shown in Fig. 2. Figs. 4 and 5 are detail side views of the hinged arms carrying the sheet-lifters, said arms having different positions. Fig. 6 is an end view of the bar carrying the arm and edge view of said arm. Fig. 7 is a side elevation of the machine, showing the position of the parts when the sheet has been carried forward, parts being broken out. Figs. 8 and 9 are detail side elevations of the sheet-retainer in different positions. Fig. 9^a is a detail horizontal sectional view of part of the standard of the carriage. Fig. 10 is an elevation of that side of the machine opposite the one shown in Fig. 7, the parts being on the return-stroke, and parts being broken out. Fig. 11 is a side and end view of the device for swinging down the arms carrying the sheet-lifters. Fig. 12 is a vertical sectional view of the wiper for shifting the sheets. Fig. 13 is a side view of the same, the shaft being in section. Fig. 14 is a cross-sectional view of the guides and face view of the slide carrying the shaft on which the wipers are mounted and an edge view of the cog-wheel on said shaft. Fig. 15 is a plan view of the machine, parts being broken out. Fig. 16 is a vertical transverse section of the machine on the line $x\,x$, Fig. 15. Fig. 17 is an enlarged detail vertical longitudinal sectional view of the elevating device for the sheet-lifter. Fig. 18 is a plan view of the racks, cams, and shifting-bars for moving the sheets laterally. Fig. 19 is a vertical transverse sectional view on the line $y\,y$, Fig. 18. Figs. 20 and 21 are enlarged detail cross-sectional views of the cams and devices for holding the sheet after it has been shifted laterally. Fig. 22 is a detail cross-sectional view of the sheet-shifter for shifting the sheet beyond the edge of the platform to permit the grippers of the press to grip it. The inclined blocks are also shown. Fig. 23 is a side view of the paper-shifter, the guide being in cross-section.

Similar letters of reference indicate corresponding parts.

The stack A of sheets a is placed on the bed or platform A′, on which the adjustable gages a^2 are provided in guide-grooves a^3. The platform B, upon which the sheet is placed after it has been removed from the stack, and on which platform the sheet is shifted forward and laterally to bring it in the proper position, is slightly elevated above the platform A′.

Two horizontal rails, C, provided with guide-grooves on their inner side, are suitably supported by angular standards B′, horizontally over the top of the platforms A′ and B, and between the said rails a cross-head, C^2, is mounted to slide. Said cross-head supports the upright inverted-U-shaped standard C^3, provided on the inside with vertical opposite guide-grooves C^4, in which the jaws C^5 can slide vertically, said jaws being secured to or formed on the outer side of a tube, C^6, mounted to slide vertically in the standard C^3, and pressed downward by a spiral spring, C^7, surrounding it, and resting at its upper end against an internal shoulder, C^{15}, of the stand-

ard C^3 and at its lower end against the jaws C^5. A rod, C^8, passes vertically through the tube C^6, and is provided above the top of said tube with a head, C^9. A spiral spring, C^{10}, surrounds the rod C^8, the upper end of said spring resting against an internal shoulder, C^{15}, of the tube C^6, and the lower end resting on an eye or sleeve, C^{11}, on the lower end of said rod C^8. In the said eye C^{11} a cross-bar, C^{12}, is held, to the downwardly-projecting ends of which the cross-bar C^{13} is fastened. On said cross-bar C^{13} two sleeves, C^{14}, are mounted in such a manner that they can be shifted toward or from each other, and when shifted can be locked in place by means of suitable thumb-screws. From each of said sleeves a bar, D, projects toward the front end of the machine—that is, in a horizontal direction toward the printing-press—and on the free end of each of said bars D a downwardly-projecting arm, D′, Figs. 4, 5, and 6, is pivoted, each arm D′ having a bevel, D^2, at its upper rear corner. A spring-strip, D^3, is fastened to the top of each bar D at the free end, and rests on the upper end of the corresponding pivoted arm, D′. To the lower end of each arm D′ a dovetailed receptacle, D^4, is secured, open at the bottom and adapted to receive a block, D^5, coated on the under side with a composition something like that of which inking-rolls for printing-presses are made or with said inking-roller composition.

On the lower end of the tube C^6 a cross-rod, E, is fixed, connected at its end by connecting-rods E′ with the ends of levers E^2, pivoted on angle-lugs E^3 on the standard C^3, the opposite ends of said levers E^2 being connected by connecting-rods E^4 with the ends of bell-crank levers E^5, pivoted to jaws E^{10} of the cross-head C^2. A latch, E^6, is pivoted on the standard C^3 and can engage an aperture or recess, E^7, of one of the jaws C^5 of the tube C^6, the spring E^8 acting on said latch and pressing it inward, Fig. 9^a. A bent or angular standard, E^9, on one of the guide-rails C serves to trip said latch E^6. (See Fig. 7.) A rod, F, projecting horizontally from the rear of the cross-head C^2, is firmly secured therein, and is provided at its free end with a head, F′, and a short distance from the cross-head with a fixed collar, F^2. Said bar F passes loosely through an aperture in the center piece, F^3, of a transverse beam, F^4, extending beyond the sides of the machine-frame and connected at its ends by the connecting-rods F^5, parts of which are only shown in dotted lines with the working mechanism of the printing-press. The center piece, F^3, of the beam is provided with two upwardly-curved arms, F^6, which can act on the shorter arms of the angle-levers E^5. The center piece, F^3, has side arms, F^8, extending into the grooves of the rails C.

On one side of the machine-frame a slide, G, is provided, having longitudinal slots G′, through which pins G^2 pass, projecting from the standards G^3, secured to the side edges of the platform B, said slide being connected by the connecting-rod G^4 with the crank G^5 on the shaft G^6, carrying the cog-wheel G^7, that can engage with the rack G^8, formed on the under side of part of the square frame G^9, connected with the center piece, F^3, of the beam F^4, as shown in Fig. 15. The cog-wheel G^7 is so mounted on the shaft G^6 that it turns the said shaft in one direction only.

On the bottom edge of the slide G a rack, G^{10}, is formed, that engages with a cog-wheel, G^{11}, Figs. 7 and 14, said wheel being mounted on a transverse shaft, G^{12}, journaled in suitable slides, G^{14}, mounted to slide between guide-bars G^{15}, held by the standards G^3. On said shaft G^{12} two sleeves, H, are held adjustably by set-screws, and each sleeve is provided with a neck, from the lower end of which a square rod, H′, projects, that is pressed downward and outward by a spring, H^2, in the neck. To the lower end of said rod H′ a piece, H^3, is hinged, as shown in Fig. 13, a spring, H^4, being provided for keeping the rod H′ and the piece H^3 in line. The lower end of said piece H^3 is pointed or tapered and shod with rubber to form a wiper for shifting the paper.

On the standards G^3, on one side of the machine, Fig. 7, two levers, I and I′, are pivoted, their lower ends being connected by a rod, I^2. Pins I^3 and I^4 on the slide G serve to act on the upper ends of the rods I and I′, respectively. The lower end of the lever I is connected by the connecting-rod I^5 with a crank, J′, projecting from a rocking-shaft, J, mounted on the standards J^2 of the platform B. The upper part of said shaft is made hexagonal, as at J^3, and on said hexagonal part J^3 the flat end of a spring, J^4, rests, that is fastened to the arms J^5 on the standard J^2. On the shaft J two adjustable sleeves, J^{10}, are mounted, on each of which two transverse arms, J^6, are secured, each having each end bent, as at J^7. Each sleeve J^{10} carries an arm, J^8, which, when the arms J^6 are inclined, as shown in Fig. 9, projects in horizontal direction toward the center of the machine. Said arms J^8 are to be adjusted the same distance from the longitudinal center plane of the machine as are the arms D′, carrying the paper-lifters D^5, so that the ends of said arms J^8 can strike against the hinged arms D′ and swing the same from the position shown in Fig. 4 into the position shown in Fig. 5.

On one of the standards G^3 (shown in Fig. 7) a lever, K, is pivoted, that has its upper end forked, on which forked end the pin K′ on the end of the slide G can act. The lower end of the lever K is connected by a connecting-rod, K^2, with the crank K^3 on one end of the shaft K^4, mounted on the standards K^5 near the end of the platform B, Fig. 7, said shaft K^4 carrying two sleeves having downwardly-projecting arms K^6, provided on the ends with cross-pieces K^7, having the bevels K^9 and stop-lugs K^8 at opposite ends. A recess, K^{11}, is formed in the top of the platform B at the edge, and forms a shoulder, K^{12},

against which the lugs K^8 can strike. On each side of the machine-frame a lever, L, is pivoted on a standard, B′, and has its upper end forked, and on said forked ends of the levers L the ends of the transverse beam F^4 can act. The lower ends of the lever L are connected by the connecting-rods L′ with the horizontally-movable racks L^2, engaging with the horizontal cog-wheels L^3, Figs. 18 and 19.

The shaft of the cog-wheel L^3 on one side of the machine carries a horizontal cam, L^4, that acts on a downwardly-projecting pin, L^5, on a transverse rod, L^6, guided in eyes L^7 on the under side of the platform B. On said rod L^6 a sleeve, L^8, is held adjustably by a screw, and from the same a pin, L^9, projects upward through a transverse slot, L^{10}, in the platform B, and on the upper end of said pin L a rail, L^{11}, is secured, which extends in the longitudinal direction of the machine. On the shaft of the other cog-wheel L^3 a cam, M, is secured, which is provided with an offset, M′. The edge of said cam can act on the pin M^2, projecting downward from the transversely-sliding rod M^3, guided to move transversely to the longitudinal axis of the machine on the under side of the platform B by the eyes M^4.

A fixed rail, M^5, provided on the top of the platform, extends in the direction of the length of the machine near the right-hand edge of the platform, and in slots M^9 of the platform angle-levers N are pivoted, which can pass through notches M^6 in the rail M^5, said angle-levers being pressed down upon the platform by the springs N^2. A plate, N^9, is secured to the upper shanks of the angle-levers N. The lower ends of the angle-levers are connected by rods N^5 with a rod, N^4, which in turn is connected with the rod M^2. The racks L^2 are connected by a cross-bar, N^6. A spring, N^7, surrounding the rod L^6, has one end rested against one of the eyes L^7 for guiding said rod and the other end against a fixed collar, N^8, of the rod L^6 and serves to press the pin L^5 on the rod L^6 against the edge of the cam L^4. The springs N^2 serve to press the pin M^2 against the cam M. The cog-wheels L^3 are not mounted rigidly on their shafts; but said shafts are provided with ratchet-wheels O, with which pawls O′, pivoted on the wheels L^3, engage, as shown in Figs. 2 and 3. In the same manner the cog-wheel G^7 is mounted on its shaft G^6.

The transverse rail W is secured at its ends to standards G^3 near the middle of the machine, and said shaft carries two adjustable sleeves, W′, each provided with a downwardly-projecting angular arm, W^2, the ends of the horizontal shanks of which can strike against pins W^3 on the dovetailed boxes D^4, carrying the blocks D^5, covered with the material for lifting the paper. A forked lever, P, is pivoted on an arm, P^6, of one of the standards B′ at one side of the machine, Fig. 10, and to the lower end of said forked lever a connecting-rod, P′, is pivoted, the opposite end of which is connected with a crank, J^{12}, on that end of the shaft J opposite the one carrying the crank J′. The shaft K^4 is provided at or near one end with an arm, Q, which is connected by a connecting-rod, Q′, with a slide, Q^2, having a dovetailed piece, Q^3, sliding in a correspondingly-grooved guide-piece, Q^4, on the platform B. To said slide Q a plate, R, is hinged, that is pressed toward the platform by a spring, R′. Said plate R is provided at its under side, a short distance from its hinged end, with a projection, S. The platform B is provided at its end edge with a projection, S′, beveled toward the middle of the machine, and provided at the end farthest from the middle of the machine—that is, adjacent to the edge of the platform—with a recess, S^2.

A short distance inward from the edge of the platform B a projection, T, is provided, which is beveled toward the edge of the platform, and is provided at the end nearest the middle of the machine—that is, farthest from the edge of the platform—with a recess, T^2, said projections S′ and T serving to raise the hinged plate R, and said notches S^2 and T^2 in said projections S′ and T serve to receive the projection S on the under side of the hinged plate R.

The operation is as follows: As shown in Fig. 1, the sheet-lifters are in contact with the uppermost sheet *a* and are about to lift the same. The arms F^6 on the center piece, F^3, of the beam F^4, which beam moves in the direction of the arrow x^2, strike against the free arms of the angle-levers F^5 and swing the same in the direction of the arrow x', Fig. 1, whereby the cross-rod E is raised, and thus the tube C^6 with which said cross-rod E is connected, is moved upward, and the spring C^7 is compressed. The jaws C^5 are also moved upward, and the latch E^6 snaps into the recess C^7 in one of the jaws, thus locking the tube C^6 and the rod C^8, which has been raised with the same in the raised position. The cross-bars C^{12} and C^{13} are raised with the rod C^8, as are also the bars D, arms D′, and the paper-lifters on the lower ends of said arms to such elevation that the sheet is above the platform B. The beam F^4 continues to move in a direction toward the printing-press—that is, in a direction of the arrow x^2, Fig. 1—but as yet has not moved the standard C^3 in the same direction, for the reason that the rod F passes loosely through the center piece, F^3, of the beam F^4. This construction is provided for the purpose of preventing the standard C^3 being moved before the sheet has been raised. The center piece, F^3, then strikes against the collar F^2, causing the center piece, the bars D, the sheet-lifters, and the sheet held by the same together to move in the direction toward the printing-press—that is, in the direction of the arrow x^2—whereby the sheet is carried upon the platform B. When the standard C^3 has almost reached the end of its stroke in the direction of the arrow x^2, the ends of the

beam F^4 strike the front prongs, w', of each lever L, which prongs w' are in the tracks of the ends of the beam F^4, as shown in dotted lines in Fig. 10, and swing the levers L in the inverse direction of the arrow x^3, Fig. 10, causing the connecting-rods L′ to move in the inverse direction of the arrow x^4, and thereby the cog-wheels L^3 are rotated, but do not turn their cams L^4 and M, for the reason that said cog-wheels are connected on their shaft by means of ratchet-wheels and pawls, the pawls slipping over the teeth of the ratchet-wheels and not catching on the same when the connecting-rods L′ are moved in the inverse direction of the arrow x^1. After the ends of the beam F^4 have acted on the upper ends of the lever L and moved them in the manner described, one end of said beam strikes the prong v' on the upper end of the lever P, Fig. 10, and swings the upper end of said lever P in the inverse direction of the arrow x^3, whereby the inner ends of the arms J^6 are swung down and the outer ends are swung up—that is, those ends nearest the center of our machine are swung down. The bent inner ends, J^7, of the arms J^6, by being swung down, rest on and hold down the sheet that has been carried forward by the sheet-lifters and bars D; but still said bars D continue to move in the direction of the arrow x^2, Fig. 1. The result is that the pivoted arms D strike against the arms J^8, which, by swinging down the arms J^6 in the manner described, are brought into horizontal position, as shown in Fig. 9, and striking the pivoted arms D′ swing the same toward the center of the machine, or inward—that is, in the direction of the arrow x^6, Fig. 10. As the edge of the sheet is held by the inner lowered ends, J^7, of the arms J^6, it is evident that the paper-lifting blocks are drawn off the paper by swinging the arms D′ in the direction of the arrow x^6. The sheet is now entirely disengaged from the lifters, and is held on the platform B by the bent ends J^7 of the arms J^2 in the position shown in Fig. 10. The beam F^4 is now moved in the direction from the press—that is, in the inverse direction of the arrow x^4, Fig. 10—by the rods F^5, connecting said beam with the printing-press. A short time after the beam has begun its return-stroke one end of the beam F^4 strikes the rear prong, v^2, of the lever P, which prong is now in a raised position, and swings the lever P in the direction of the arrow x^3, whereby, by means of the connecting-rod P′ and crank J^{10}, the shaft J is turned in such a manner as to bring the arms J^6 into the horizontal position, said shaft being held in place by the springs J^4. The sheet now lies freely on the platform B. Immediately after one end of the beam F^4 has acted upon the upper end of the lever P both ends of the beam F^4 act on the rear prongs, w^2, of the levers L, which prongs are now in the raised position, as in Fig. 10, swinging them in the direction of the arrow x^3, whereby the connecting-rods L′ are moved in the direction of the arrow x^4, Figs. 10 and 18. Thereby the wheels L^3 are turned, and as their pawls now engage with the ratchet-wheels on the shafts the cams L^4 and M are moved in the directions indicated by their arrows. The result is that the cam L^4, by means of the pin L^5 and rod L^6, moves the rail L^{11} in the direction of the arrow d', Fig. 19, said rail acting on the side edges of the sheet and pressing the opposite edge of the sheet against the fixed rail M^5. At the same time that the paper is being shifted laterally in the manner described the cam M has rotated in the direction of its arrow, thus permitting the pin M^2 to move to the right, Fig. 18, and the angle-levers N to swing down until the plate N^9 is a short distance above the sheet. When the offset M′ arrives at the pin M^2, said pin makes a sudden movement to the right, and thereby the plate N^9 is pressed on the right-hand edge of the sheet and holds the sheet firmly at said right-hand edge. If the sheet is rather wide, it may occur that by the action of the rail L^{11} the sheet is buckled, and if it were not held at the right-hand edge when the rail L^{11} recedes it might get out of adjustment; but this cannot happen when the right-hand edge is held. As the cam M continues to revolve its edge acting on the pin M^2 moves the same to the left, whereby the angle-levers N and plate N^9 are raised and the sheet is released, its right-hand edge resting against the inner side of the rail M^5. During these movements the sheet-holder has been in the raised position and the arms D′ are still inclined. By the return movement of the beam F^4 and standard C^3 the bars D and sheet-lifters have also been returned in the inverse direction of the arrow x^4. As stated, a rack-frame, G^9, is provided on the center piece, F^3, of the beam F^4, and when said beam has almost completed its return-stroke said rack acts on the cog-wheel G^6 and turns the same in the direction of the arrow d^2, Fig. 7, whereby the slide G is moved in the direction of the arrow d^3, Fig. 7. As soon as the slide begins to move in this direction the pin K′, acting on the rear raised prong, y', of the lever K, swings the said lever in the direction of the arrow d^4, whereby the arms K^6 on the shaft K^4 are swung in the direction of the arrow g', and the lugs K^8 on the ends of the plates K^7 come in contact with the shoulders K^{12} of the recess K^{11}. As soon as the rack begins to move in the direction of the arrow d^3 the ratchet-wheel G^{11} is rotated in the direction of the arrow g^2, Fig. 7, and the tubular arms H′ are swung in like direction, causing the wipers H^3 to come into the position shown in dotted lines in Fig. 7, and as said wipers pass over the sheet they move it in the direction of the arrow x^2, Fig. 7, causing the edge of the sheet nearest the printing-machine to abut against the stop-lugs K^8. By the time that the slide G has been moved such a distance as to operate the wipers in the manner described the pin I^4 acts on the upper end of the rod I′ and swings the same in the direc-

tion of the arrow *h'*, whereby the front ends of the arms J⁶, or ends nearest the printing-press, are swung down upon the paper, which is thus held in place. The pin I⁴ can act on the upper end of the lever I', which is in a vertical position; but the pin I³ passes over the upper end of the lever I without acting upon it, as said lever is in the inclined position shown in Fig. 7. The rack G⁹ is of sufficient size to cause an entire rotation of the cog-wheel G⁷ in the direction of the arrow *d²*, and after the wheel G⁷ has completed one-half a rotation the slide G is moved in the inverse direction of the arrow *d³*. By this inverse movement of the slide the wipers H³ are rotated in the inverse direction of the arrow *g²*, but do not cause the shifting of the sheet to the rear—that is, from the press—for the reason that the sheets are held by the ends J⁷ of the arms J⁶, and that the wipers are hinged and can bend, as shown in dotted lines in Fig. 13. After further movement of the slide G in the inverse direction of the arrow *d³* the pin I³ acts on the upper end of the lever I and swings the same in the direction of the arrow *h²*, whereby the arms J⁶ are brought into horizontal position and the paper is released. The pin I⁴ passes over the upper end of the lever I' without acting on it, for the reason that said lever I' is in inclined position and the said pin I⁴ can clear it. The lever I, however, has been brought into the vertical position, so that the pin I³ can act upon it by the previous movement of the connected rods I and I', for, as has been stated, during the stroke of the rack G to the rear, Fig. 7, the pin I⁴ acts on the lever I' and inclines the same, whereby the lever I is brought into vertical position. Finally, the pin K', acting on the front prong, *g²*, of the lever K, swings the said lever in the inverse direction of the arrow *d⁴*, whereby the arms K⁶ are swung in the inverse direction of the arrow *g'* and raised. The paper is now free on the platform. By swinging the arms K⁶ in the inverse direction of the arrow *g'* the slide Q² is moved in the direction of the arrow *m'*—that is, in a direction toward the printing-press, Figs. 10, 15, and 22—and its hinged plate R, sliding down the inclined block T, rests upon the sheet, upon which it is pressed by the spring R', and feeds said sheet beyond the edge of the platform B, so that it can be gripped by the grippers of the printing-press. When the slide Q² arrives at the edge of the platform, the projection S on the under side of the plate R slides up the inclined projection S', and is thus lifted clear of the paper, permitting the grippers to draw the paper into the printing-machine. The slide Q² is returned when the arms K⁶ swing down. By this time the rack G⁸ has passed entirely over the cog-wheel G⁷. The outer end of the latch E⁶ strikes against the arm E⁹, whereby its inner end is withdrawn from the notch E⁷ in the jaw C⁵, whereby the tube C⁶ is released and pressed downward by its spring C⁷, whereby the sheet-lifters D⁵ are pressed upon the uppermost sheet of the stack. The beam F⁴ is now moved in the direction of the arrow *x²*, Fig. 1, by the connecting-rods F⁵. The rack G⁸ again acts on the cog-wheel G⁷ without rotating the shaft G⁶—that is to say, when the rack G⁸ passes over the cog-wheel G⁷ in the direction from the printing-press said cog-wheel rotates the shaft; but when the rack passes over the cog-wheel in the direction toward the printing-press the cog-wheel rotates without rotating the shaft. The arms F⁶ of the center piece, F³, again strike the ends of the angle-levers E⁵, whereby the tube C⁶ is lifted, as is also the new sheet, all in the manner previously described. Just before the standard C³ completes its return-stroke the horizontal shanks of the arms W² strike the pins W³ on the sides of the blocks D⁴ and swing the arms D' from the inclined position which they have during the return-stroke into the vertical position, so that the pieces D⁵ can be pressed upon the uppermost sheet.

So that the operation may be made fully understood we will recapitulate briefly: The arms on the center piece, F³, strike against the ends of the angle-levers E⁵, whereby the sheet is raised, and then said raised sheet is carried upon the platform B. The front part of the sheet is held on the platform by the rear ends of the arms J⁶, which are swung down by the action of one end of the beam F⁴ on the lever P, and then the arms D' are swung to the rear and the sheet-lifters are disengaged from the sheet, which is now held on the platform B by the rear ends of the arms J⁶. Then by the action of one end of the beam F⁴ in its return-stroke on the upper end of the lever P said arms J⁶ are swung into the horizontal position and the sheet is free. Then the ends of the beam F⁴ act on the ends of the levers L, whereby the sheet is shifted laterally. Then by the action of the rack G⁸ on the cog-wheel G⁷ the arms K⁶ are swung down and the wipers move the front edge of the sheet against the stop-lugs K⁸ on the ends of the arms K⁶. Then by the action of the pin I⁴ on the lever I' the front ends of the arms J⁶ are swung down upon the sheet and hold the same, and the wipers pass back over the sheet, but cannot shift the same. Then the pin I³ acts on the upper end of the lever I and the arms J⁶ are swung up and the paper is free, its front end resting against the stop-lugs K⁸. Then the pin K' acts on the upper end of the lever K and the arms K⁶ are swung up, and at the same time the hinged plate R moves the edge of the sheet beyond the edge of the platform B. The arms K⁶ J⁶ J⁸, the wipers, the arms W², rail L¹¹, and the bars D are all adjustable on their shafts, according to the width of the sheet. The standard C³ and the center piece of the beam F⁴ form a carriage, although they move separately at times. The spring C¹⁰ keeps the rod C⁸ lowered, so that the head C⁹ rests on the upper end of the tube C⁶. The spring C⁷ serves to

press the tube C^6 downward. When the standard C^3 arrives at the arm E^9, the tube C^6, the rod C^8, the arms D, and the paper-lifters are in the raised positions, and when the latch E^6 is withdrawn the tube C^6 is released and pressed down by its spring C^7. When the stack of paper is very high, the upper end of the rod C^8 projects some distance from the upper end of the tube C^6. As the height of the stack decreases the spring C^{10} gradually presses said rod C^8 down farther. Fig. 17 shows the rod C^8 in its lowest position.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In a sheet-feeding machine for printing-presses, the combination, with a frame, of a reciprocating carriage, bars supported by said carriage, arms hinged to said bars, blocks on swinging ends of said arms, and a covering of inking-roller composition on said blocks, substantially as shown and described.

2. In a sheet-feeding machine for printing-presses, the combination, with a frame, of a carriage, bars on said carriage, arms pivoted to said bars, sheet-lifting blocks on the swinging ends of said arms, and springs on the bars resting on the upper ends of said pivoted arms, substantially as shown and described.

3. In a sheet-feeding machine for printing-presses, the combination, with a frame, of a carriage, bars on the same, arms pivoted to the ends of said bars, said arms having the inner corners at the upper ends beveled, sheet-lifting blocks on the swinging ends of said arms, and springs secured on the bars and resting on the upper ends of said arms, substantially as shown and described.

4. In a sheet-feeding machine for printing-presses, the combination, with a frame, of a carriage mounted to slide on said frame, a sheet-lifter carried by said carriage, sheet-shifters operated by parts of the carriage, and sheet-retainers operated by parts of the carriage, substantially as set forth.

5. In a sheet-feeding machine for printing-presses, the combination, with a frame, of a carriage mounted to slide on said frame, sheet-lifters carried by said carriage, a table on which the sheet can be placed, a rail mounted to slide laterally on said table to shift the sheets laterally, sheet-wipers operated by the carriage, and sheet-retainers operated by the carriage, substantially as shown and described.

6. In a sheet-feeding machine for printing-presses, the combination, with a frame, of a carriage mounted to slide on said frame, sheet-lifters carried by said carriage, a transverse beam sliding with the carriage on the frame and connected therewith, levers pivoted on the frame and operated by the ends of said beam, a laterally-movable sheet-shifting rail operated by intermediate power-transmitting members from said pivoted levers, paper-wipers operated by the carriage, and paper-retainers operated by the carriage, substantially as shown and described.

7. In a sheet-feeding machine for printing-presses, the combination, with a frame, of a carriage sliding on the same, a transverse beam moving with said carriage and connected therewith, a platform for receiving the sheets, sheet-lifters carried by the carriage, pivoted levers operated by the ends of said beam, a laterally-movable paper-shifting rail operated by suitable intermediate power-transmitting members from said pivoted levers, sheet-wipers operated by the carriage, sheet-stops operated from the carriage, sheet-retainers operated by the carriage, and a sheet-shifter at the end of the platform, also operated from the carriage, substantially as herein shown and described.

8. In a sheet-feeding machine for printing-presses, the combination, with a frame, of a carriage mounted to slide on the same, bars supported by said carriage, arms pivoted to the ends of said bars, paper-lifting blocks on the ends of said arms, a rocking shaft mounted on the frame, bars fixed on said shaft and projecting toward the pivoted arms and serving to tilt the same, and fixed arms on the frame in the tracks of the said pivoted arms on their return-stroke for the purpose of swinging the arms back to the normal position, substantially as shown and described.

9. In a sheet-feeding machine for printing-presses, the combination, with a frame, of a carriage mounted to slide on the same, bars supported by said carriage, arms pivoted to the ends of said bars, sheet-lifting blocks on the ends of said arms, a rocking shaft, sheet-retaining arms on said shaft, a rack on the carriage, a cog-wheel adapted to engage said rack, a slide on the frame, a connecting-rod connecting said slide with a crank on the shaft carrying the cog-wheel, pins on the slide, connected levers on which said pins can act, and a rod connecting said levers with an arm on the shaft carrying the sheet-retaining arms, substantially as shown and described.

10. In a sheet-feeding machine for printing-presses, the combination, with a frame, of guide-rails on the same, a carriage mounted to slide on said rails, a platform, a rock-shaft extending across said platform, arms on said rock-shaft, stops on the ends of said arms, a slide on the frame, a pin on the slide, a swinging lever on which the pin can act, a rod connecting said swinging lever with the arms of the shaft carrying the arms having the stops, a rack on the carriage, a shaft provided with a crank, a cog-wheel on said shaft, a rod connecting the slide with said crank, and sheet-retaining arms operated by the slide, substantially as shown and described.

11. In a sheet-feeding machine for printing-presses, the combination, with a frame, of guide-rails on the same, a carriage mounted to slide on the guide-rails, sheet-lifters supported by said carriage, a slide on the frame,

paper-retaining arms, and arms having stops operated by the slide, a rack on the carriage, a cog-wheel adapted to engage said rack, a crank-shaft carrying said cog-wheel, and a rod connecting the crank with the slide, substantially as shown and described.

12. In a sheet-feeding machine for printing-presses, the combination, with a frame, of guide-rails on the same, a carriage mounted to slide on the guide-rails, sheet-lifters supported by the carriage, a platform, said platform being provided at its end with a recess forming the shoulder, a rock-shaft having arms, stop-lugs on said arms, which stop-lugs can swing against the shoulder formed by the recess, a slide on the frame, levers for operating the swinging stop-lug arms from the carriage, and mechanism, substantially as herein described, for operating the slide from the carriage, substantially as shown and described.

13. In a sheet-feeding machine for printing-presses, the combination, with a frame and a platform, of rails on the frame, a carriage mounted to slide on said rails, a rack on said carriage, a cog-wheel, a crank-shaft carrying the cog-wheel, the slide G on the frame, a connecting-rod connecting said slide with the crank-shaft, the pins I^3 and I^4 on the slide, the connected pivoted levers I and I′, the shaft J, having the arms J^6, the crank J′ on the shaft J, and the rod I^5, connecting the crank of the shaft J with the rods I I′, substantially as shown and described.

14. In a sheet-feeding machine for printing-presses, the combination, with a frame and platform, of rails on the frame, a standard mounted to slide on the rails, a sheet-lifter supported by said standard, a transverse beam, F^4, connected with the sliding standard, the lever P, the slide G, mechanism, substantially as herein shown and described, for operating said slide from the standard, the levers I I′, the rocking shaft J, the arms J^6 on the same, the rod I^5, connecting the crank-arm on said shaft J with the rods I I′, and the connecting-rod P′, connecting another crank on said shaft J with the lever P, substantially as shown and described.

15. In a sheet-feeding machine for printing-presses, the combination, with a frame and platform, of rails on the frame, a sliding standard on said rails, a rocking shaft above the platform, paper-retaining arms on said rocking shaft, and independent levers on opposite sides of the frame connected with said rock-shaft, substantially as shown and described.

16. In a sheet-feeding machine for printing-presses, the combination, with a frame and platform, of rails on the frame, a sliding standard on the rails, sheet-lifters supported by the standard, a rocking shaft at the end of the platform, arms having stop-lugs on said shaft, a slide connected with the rocking shaft, a hinged plate on said slide, beveled projections on the platform acting on said hinged plate, paper-retaining arms, and mechanism, substantially as herein shown and described, for operating the shaft carrying the arms having the stop-lugs and the shaft carrying the paper-retaining arms from the sliding standard, substantially as shown and described.

17. In a sheet-feeding machine for printing-presses, the combination, with a frame and platform, of a fixed rail on the platform, a longitudinal transversely-movable rail on the platform, guide-rails on the frame, a sliding standard supported by the guide-rails, a transverse beam supported by the guide-rails and connected with the sliding standard, levers pivoted to the side of the frame, on which levers the ends of the transverse beam can act, racks connected with the levers, cog-wheels engaging said racks, cams on the shafts of the cog-wheels, a pin on the movable rail on the platform, on which pin one of the cams acts, angle-levers at the fixed rail, a rod connecting the angle-levers, and a pin on said rod, on which pin the other cam acts, substantially as shown and described.

18. In a sheet-feeding machine for printing-presses, the combination, with a frame and platform, of the guide-rails C, the sliding standard C^3, the sliding beam F^4, connected therewith, the two levers L, pivoted on the frame and actuated by the ends of the beam F^4, the racks L^2, connected with the levers L, the cog-wheels L^3, engaged with the racks L^2, the cams L^4 and M, the movable rail L^{11}, the rod L^6, the spring N^7, the pin L^5, the fixed rail M^5, the angle-levers N, the rods N^4 and N^5, the rod M^3, the pin M′, and the springs N^2, substantially as herein shown and described.

19. In a sheet-feeding machine for printing-presses, the combination, with a frame, of rails, a standard mounted to slide on said rails, bars supported by the standard, hinged arms on the ends of the bars, paper-lifters on said arms, a rock-shaft having cams that can abut against the sheet-lifting arms, a shaft, W, the arms W^2 on the same, pins W^3 on the paper-lifters, and mechanism, substantially as herein shown and described, for operating the rocking shaft from the sliding standard, substantially as shown and described.

20. In a sheet-feeding machine for printing-presses, the combination, with a frame, of rails on the same, a standard mounted to slide on the rails, a sheet-lifter supported by the sliding standard, a rocking shaft, wipers on said rocking-shaft, a cog-wheel on the rocking shaft, a slide on the side of the frame provided with a rack engaged with said cog-wheel, and mechanism, substantially as shown and described, for operating the slide from the standard, substantially as shown and described.

21. In a sheet-feeding machine for printing-presses, the combination, with the frame, of rails on the same, a sliding standard on the rails, sheet-lifters suspended from the standard, the slide G on the frame, which slide is

provided with a rack, G^{10}, the cog-wheel G^{11}, engaged with the rack G^{10}, the rails G^{15}, the adjustable bearings G^{14}, the shaft G^{12}, mounted in said bars G^{14} and carrying the wheel G^{11}, the sleeves H, having hollow arms, the pieces H′ in said arms, the hinged pieces H^8 on the pieces H′, and mechanism, substantially as shown and described, for operating the slide G from the sliding standard, substantially as shown and described.

22. In a sheet-feeding machine for printing-presses, the combination, with a frame, of rails, the sliding standard C^3 on the rails, the sliding tube C^6 in the standard, the spring C^7, pressing the tube downward, the rod C^8 in the tube C^6, the spring pressing the rod C^8 downward, and sheet-lifters supported from said rod C^8, substantially as shown and described.

23. In a sheet-feeding machine for printing-presses, the combination, with a frame, of rails, the sliding standard C^3 on the rails, the sliding tube C^6 in the standard, having the jaws C^5, of which one is provided with a notch, E^7, a spring for pressing the tube downward, sheet-lifters supported by said rod, a latch pivoted on the standard for locking the tube C^6 in the raised position, and the arm E^9 on one of the rails for tripping said latch, substantially as set forth.

24. In a sheet-feeding machine for printing-presses, the combination, with a frame, of rails, a sliding standard on the rails, a tube mounted to slide in the standard, sheet-lifters supported by said tube, angle-levers pivoted on parts of the standard and connected by intermediate levers with the sliding tube, a transverse beam mounted to slide on the rails, a rod projecting from the standard through the transverse beam, and arms on the transverse beam to act on the angle-levers, substantially as shown and described.

25. In a sheet-feeding machine for printing-presses, the combination, with a frame, of rails, a sliding standard on the rails, a tube mounted to slide in the standard, sheet-lifters supported by said tube, angle-levers pivoted on parts of the standard and connected by intermediate levers with the sliding tube, a transverse beam mounted to slide on the rails, a rod projecting from the standard through the transverse beam, and arms on the transverse beam to act on the angle-levers, a latch for locking the tube in raised position, and an arm on one of the rails for tripping said latch, substantially as shown and described.

In testimony that we claim the foregoing as our invention we have signed our names in presence of two subscribing witnesses.

JACOB C. DANZIGER.
SAMUEL DANZIGER.

Witness for J. C. Danziger:
OSCAR F. GUNZ,
Witnesses for S. Danziger:
LOUIS A. DANZIGER,
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